THURSDAY, JUNE 21, 1900.

THE REMINISCENCES OF A VETERAN OF SCIENCE.

Erinnerungen aus meinem Leben. By A. Kölliker. Pp. x+399; with 7 plates, 10 text figures, and portrait of the author. (Leipzig: W. Engelmann, 1899.)

THE memoirs of the venerable Professor of Anatomy at Würzburg will interest a wide circle of readers in this country, whether amongst the older generation of scientific men, whose privilege it has been to know the author as a genial friend and colleague, or amongst the juniors in rank and years, to whom the name of Kölliker has been one which from their youth upwards they have learnt to respect as that of a great leader in scientific thought and discovery. Many of the latter class may, perhaps, learn from this book, for the first time, how much modern zoology owes to its author. So rapid has been the advance of biological science in the latter half of the nineteenth century, and so great is the interval, judged not by time, but by the progress of knowledge, which separates the science of to-day from that of fifty years ago, that there is always considerable danger of the merits of those who have grown grey in the ranks of science being overlooked or insufficiently realised by the younger generation. Students are taught at an early stage in their career facts or principles which seem so well established or even self-evident, in the light of current knowledge, that it is quite an awakening to find that the man who first enunciated them is still living in our midst. To give one instance, a student of zoology is taught, probably in the very first lecture he attends, the distinction between Protozoa and Metazoa based upon the essentially unicellular nature of the individual in the former sub-kingdom. If he reflects at all on the matter, a truth so obvious and so easily demonstrated will seem to him one which has been recognised by mankind perhaps from a remote antiquity. Yet it was Kölliker who first, in 1845, pointed out the existence of unicellular animals, and brought forward the Gregarines as instances, and who later, in conjunction with von Siebold, expressed the opinion that all the Infusoria, with the exception of such forms as the Rotifers, consisted of single cells. In a further work upon *Actinophrys* this conclusion was extended to the Rhizopods, and so a great generalisation was established, the truth of which is now never called in dispute.

Quite apart, however, from the great interest which these memoirs possess from the scientific point of view, their appearance at the present time is welcome for other reasons. At a period of strained political relations, when our country appears isolated in aims and sympathies from the rest of Europe, when international antipathies and prejudices seem in a fair way to spread from the official to the personal sphere, it is a refreshing change to read the narrative of one who was a frequent and a welcome visitor in our midst. To judge, at least, from the prevailing tone of this book, its author is no "Britenfresser." He refers constantly with warmth, we might say with affection, to the hospitality of his many friends in this country and to the pleasant times he spent in their homes, feelings which, we can be sure, were as warmly reciprocated by those about whom he writes.

The book is divided into two parts, the one personal, the other scientific. Part i. contains a general account of his life, with details of his many scientific and other journeys, and a brief account of his relations to various learned societies. Part ii. may be described as a *catalogue raisonnée* of his works, and is a marvellous record of many-sided scientific activity. His publications, amounting to nearly 250 memoirs, are arranged under the headings of histology, anatomy, physiology, embryology, evolution, comparative anatomy and zoology, and other miscellaneous items. Under each subdivision is given a historical account of his work, its main results, the ideas which guided him, and the conclusions which he upheld. Here much will be found of great value to the student—using the word in its widest sense—which cannot be dealt with adequately within the limits of a brief review. We turn, therefore, with greater interest to the personal narrative set forth in Part i.

Rudolf Albert Kölliker was born at Zürich on July 6, 1817. His boyhood and schooldays were passed in his native town, and he was intended at first for a business career, but, fortunately for science, this idea was given up, and he entered Zürich University, in 1836, as a medical student. At the University his attention was first given to botany, a subject in which he had as fellow-student his intimate friend, Carl Nägeli, and his first publication (1839) was a list of the phanerogams of Zürich. Besides other medical and scientific courses he attended the stimulating lectures of Oken on zoology and nature-philosophy. In 1839 he spent a semester at Bonn, and attended lectures on surgery and kindred subjects which were still delivered in Latin. He next went to Berlin for three semesters, from 1839 to 1841, a period which he describes as a turning-point in his life, since here he came under the influence of two great masters, whose courses he attended—namely, Johannes Müller and Jakob Henle. Of the former, he writes: "the comprehensive outlook by which he connected forms widely separated, and showed what they had in common, was especially stimulating and, for me, new." From Henle on the other hand, he received his first introduction to the cell-theory of Schwann, and his attention was directed to the structure of the animal body in a number of lectures and demonstrations which he describes with enthusiasm:—

"Now when the youngest medical student is acquainted with all this and much more from pictures of all kinds, and the facts concerning the minutest structure of the body are in every one's mouth even at school, it is not easy to realise the impression made upon the student at that time by the first sight of a drop of blood, a ciliated lining, a section of bone or a striped muscle fibre, and the impress of these experiences remains permanently in the memory."

Besides Müller and Henle, he attended many other eminent teachers at Berlin, including Ehrenberg and Remak. From the latter he received his first demonstrations of the embryology of the chick. In spite, however, of his ardent medical and scientific pursuits, he found time to attend lectures on ethics and Hegelian philosophy. It was a result doubtless of Henle's influence that his first

anatomical memoir was an investigation upon spermatozoa, published in 1841, with which he took his degree of philosophy at Zürich in 1841, and of medicine at Heidelberg in 1842. In the former year he passed his State examination, of which he records the following contretemps:—

"I, who had at my fingers' ends the finest ramifications of the cranial nerves, the structure of the auditory labyrinth, of the eye, the brain, and so forth, was unable to answer a question on the portal vein."

This is an experience which will assuredly come home to many, and while hence eliciting our sympathies, will at the same time afford no slight consolation to those who reflect on the subsequent achievements of the unfortunate examinee.

In 1841 Kölliker was appointed assistant to Henle, who had received the chair of anatomy at Zürich. In the following year he took a trip to Naples, where he made the acquaintance of Delle Chiaje, Costa and Krohn, and occupied himself with, amongst other things, his well-known studies on the development of Cephalopods. In 1843 he became docent at Zürich, and was prosector to Henle from 1842 until the latter's promotion to Heidelberg in 1844. Henle's chair was then divided into one of anatomy and one of physiology, and Kölliker received the latter; but in 1847 he accepted a call to Würzburg. His departure from Zürich, which was much regretted there, was largely caused by political intrigues in the faculty of the University.

At Würzburg he occupied, at first, the chair of comparative anatomy, but in 1849 he received that of anatomy, which he has now filled for more than fifty years, in a way that needs no praise. The names of many of the most eminent professors of anatomy in Germany, past or present, are to be found in the lists of his pupils or assistants, of whom it is only necessary to mention C. Gegenbaur, Fr. Leydig, R. Wiedersheim, H. Grenacher and Th. Eimer. In 1848 he was associated with von Siebold in founding the *Zeitschrift für wissenschaftliche Zoologie*, of which famous journal he is still one of the editors.

The accounts of his many journeys are compiled, for the most part, from letters written by him at the time to his relations or friends. There is much of interest to be found in them, especially in his visits to England. His first acquaintance with this country was made in 1845, and renewed on many subsequent occasions. In his letters he gives his impressions of England and English life. He quickly made for himself a large circle of intimate scientific friends, amongst whom he mentions, particularly in his earlier letters, the names of Todd, Bowman, Grant, Sharpey, Edward Forbes and Wharton Jones. His time in London seems to have been very well filled up, as he writes in one letter that in the last twelve days he had gone through nine dinners and two breakfasts, some of which do not seem to have been very entertaining. "I took part yesterday in a fearfully wearisome dinner, enough to kill one (etwas ganz totmachendes)," he writes; and further on he complains that "these everlasting dinners, lasting from 6 to 11 o'clock, have taken me *en grippe*, as the French say; but what can one do?" But in other cases he seems to have been happier. In London he is presented at Court, and finds that "the Queen is really pretty, and Prince Albert is also a handsome man." On the eve of his departure, he expresses himself almost as much at home in London, in spite of its size, as in Zürich, and considers it "very interesting, often pleasant, but for the most part fatiguing." He visited this country again in 1850 and 1857, on both of which occasions he spent some, or most, of the time in Scotland, where he became intimately acquainted with John Goodsir and Allen Thomson, and in London with Queckett. His letters from Scotland to C. Th. von Siebold contain some interesting remarks about English science and scientific men.

"The English doctors and physicians are, above all, practical men, and all that pertains to the theoretical side takes with them the second place. This is partly owing to the fact that the English are a people occupied chiefly with commerce, but only partly so; the chief cause of the phenomenon in question is the fact that science does not hold the place it deserves in popular estimation, nor is it supported by the Government in such a way that a man who devotes himself to it can be free from care."

This is the reason, he thinks, why so many men full of enthusiasm for science remain in practice, and finally lose themselves in it; while others regard theoretical studies merely as an advertisement to gain them more clients, since practice in England is golden, and procures for the practitioner a position which contrasts vividly with that of a professor.

"I know only three anatomists and physiologists in England," he adds, "who do not practise—namely, Owen, Sharpey and Grant, of whom Owen alone has a position at all equal to his merits."

In 1850 he also paid a short visit to Oxford, where he met Acland, Strickland and J. V. Carus, but found little that attracted him, and he returned, he tells us, to noisy but infinitely more stimulating London, well satisfied that he was not obliged to spend all his days in "this most peculiar of all university towns."

Space does not permit of reference to the many interesting personal reminiscences or amusing incidents which recur so frequently in this book, especially that detailed in two letters on p. 162, of which we lose nothing by its being to a large extent veiled in the obscurity of the English tongue. It can only be said that the book affords delightful reading, and gives pleasing glimpses of a warm-hearted and charming personality as well as of a great man of science. E. A. M.

DIFFERENTIAL EQUATIONS.

Theory of Differential Equations. By A. R. Forsyth, Sc.D., F.R.S. Part i. (1890). Pp. xiv+340. Part ii. (1900). Pp. xii + 344, and x + 392. (Cambridge: At the University Press.)

ALTHOUGH these volumes contain more than a thousand pages, it would be premature to express an opinion upon the plan and proportions of Prof. Forsyth's work as a whole; so much of his vast subject still remains unrepresented. Thus the reader will find nothing, except incidentally, of the theory of partial differential equations; and, what is more remarkable, the subject of ordinary linear equations has been reserved for a future volume. However, the two parts which have